Paper No. 13

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte SHANKAR NATARAJ, BRIAN T. CARVILL, JEFFREY R. HUFTON, STEVEN G. MAYORGA, THOMAS R. GAFFNEY and JEFFREY R. BRZOZOWSKI

Appeal No. 1998-2224
Application No. 08/624,147

ON BRIEF

Before WALTZ, LIEBERMAN and PAWLIKOWSKI, Administrative Patent Judges.

WALTZ, Administrative Patent Judge.

**DECISION ON APPEAL**

This is an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 1 through 27, which are the only claims remaining in this application.

According to appellants, the invention is directed to a continuous process for operating equilibrium controlled reactions under isothermal conditions utilizing a plurality of reactors operated in a predetermined time sequence wherein the heating and cooling requirements in a moving reaction mass

transfer zone are provided by indirect heat exchange, followed by a particular sequence of separation steps (Brief, pages 4-6). A copy of illustrative claim 1 is attached as an Appendix to this decision.[1]

The examiner has relied upon the following references as evidence of obviousness:

| | | |
|---|---|---|
| Dexheimer et al. (Dexheimer) | 5,141,662 | Aug. 25, 1992 |
| Keefer | 5,256,172 | Oct. 26, 1993 |
| Dandekar et al. (Dandekar) (filed Aug. 1, 1994) | 5,449,696 | Sep. 12, 1995 |
| Tsuchiyama et al. (Tsuchiyama) (published Japanese Patent Bulletin) | 52-124002 | Oct. 18, 1977 |
| Hirai et al. (JP '436) (published Japanese kokai)[2] | 58-049436 | Mar. 23, 1983 |

[1] We note that claim 1 as found in both the Appendix to the Brief, Paper No. 9, and the Supplemental Appendix dated Jan. 24, 2001, Paper No. 12, fail to recite step (c) of claim 1 on appeal. The copy of claim 1 attached as an Appendix to this decision is taken from the claim as amended May 7, 1997, Paper No. 6.

[2] We rely upon and cite from English translations of both the Tsuchiyama and JP '436 documents, previously made of record.

Claims 1-27 stand rejected under 35 U.S.C. § 112, ¶1, "as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art" that appellants were in possession of the invention as now claimed (Answer, page 3). Claims 1-27 also stand rejected under 35 U.S.C. § 112, ¶2, "as being indefinite" (*id.*). Claims 1-7 stand rejected under 35 U.S.C.
§ 103 as unpatentable over Tsuchiyama taken with Keefer (*id.*). Claims 8-27 stand rejected under 35 U.S.C. § 103 as unpatentable over Tsuchiyama taken with Keefer further in view of Dandekar, JP '436, and Dexheimer (Answer, page 4). Claims 1-27 stand rejected under the "judicially created doctrine of obviousness-type double patenting" over claims 1-22 of co-pending application no. 08/419,317 in view of Dexheimer (Answer, page 5).[3]

We *reverse* all of the examiner's rejections under sections 112 and 103 essentially for the reasons set forth in

[3] A decision by this same merits panel was mailed May 14, 2001, in co-pending application no. 08/419,317, which had been assigned Appeal No. 1998-1219.

the Brief and the reasons below. We *affirm* the examiner's rejection of claims 1-27 under the judicially created doctrine of obviousness-type double patenting essentially for the reasons in the Answer and the reasons below. Accordingly, the decision of the examiner is affirmed.

**OPINION**

*A. The Rejection under 35 U.S.C. § 112, ¶2*

"The legal standard for definiteness [under section 112, ¶2] is whether a claim reasonably apprises those of skill in the art of its scope. [Citations omitted]." *In re Warmerdam,* 33 F.3d 1354, 1361, 31 USPQ2d 1754, 1759 (Fed. Cir. 1994). "[T]he definiteness of the language employed must be analyzed - not in a vacuum, but always in light of the teachings of the prior art and of the particular application disclosure as it would be interpreted by one possessing the ordinary level of skill in the pertinent art." *In re Angstadt,* 537 F.2d 498, 501, 190 USPQ 214, 217 (CCPA 1976), quoting from *In re Moore,* 439 F.2d 1232, 1235, 169 USPQ 236, 238 (CCPA 1971).

The examiner has stated that the terms “the heating ... each reactor,” “predetermined time sequence,” and “equilibrium controlled” in claim 1 are unclear (Answer, page 3).

It is well settled that the initial burden of presenting a *prima facie* case of unpatentability, based on the prior art or any other ground, rests with the examiner. *See In re Oetiker,* 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). The only basis the examiner has presented to establish the indefiniteness of “the heating ... each reactor” is that it “is unclear what it is.” Answer, page 3. In our view, the examiner has not met the initial burden of establishing that one of ordinary skill in the art would not be apprised of the scope of the language in question, especially when read in light of the specification (pages 23 through 28; see the Brief, page 12).

The only basis presented by the examiner for the indefiniteness of “predetermined time sequence” is that it is “unclear in the basis for determining it.” Answer, page 3. Again we determine that the examiner has not met the initial burden, especially in light of the specification disclosure

and teaching at page 16, last sentence, and page 23, ll. 4-11.[4]

The only basis presented by the examiner to support the indefiniteness of "equilibrium controlled" is that "the closed system required for equilibrium is not present." Answer, page 3. However, as noted by appellants on pages 13-14 of the Brief, the specification defines the term "equilibrium controlled" (page 1, ll. 4-14) and further discloses representative equilibrium controlled reactions (page 29, ll. 1-12). Therefore we determine that the examiner has failed to present a *prima facie* case that one of ordinary skill in this art would not have been apprised of the scope of the language in question.

For the foregoing reasons and those set forth in the Brief, we determine that the examiner has not established a *prima facie* case of unpatentability regarding the indefiniteness of the language in question. Accordingly, the

[4] Appellants quote this passage on page 13 of the Brief but mistakenly cite page 26, ll. 4-11 (see the Brief, page 12, last line).

rejection of claims 1-27 under 35 U.S.C. § 112, ¶2, is reversed.

*B. The Rejection under 35 U.S.C. § 112, ¶1*

The examiner states that the "newly added 'wherein ... product' limitation to claim 1c is not supported by the original specification." Answer, page 3. Appellants submit that there is implicit basis or support for this phrase when steps (c) and (d) of claim 1 are read together (Brief, pages 9-11).

An *ipsis verbis* disclosure is not necessary to satisfy the written description requirement of section 112. The disclosure need only reasonably convey to one of ordinary skill in the art that the inventors had possession of the subject matter in question at the time of filing. *See In re Edwards,* 568 F.2d 1349, 1351-52, 196 USPQ 465, 467 (CCPA 1978). We agree with appellants that there is implicit basis or support for the phrase "wherein the weakly adsorbing purge fluid is a fluid other than the less adsorbable product" since the weakly adsorbing fluid could not be purged as required by

step (d) of claim 1 if this limitation of step (c) in claim 1 was not met. See the specification, page 34, ll. 17-22.

For the foregoing reasons and those set forth in the Brief, we determine that there is implicit support for the language in question in the disclosure as filed. Accordingly, the examiner's rejection of the claims on appeal under 35 U.S.C. § 112. ¶1, is reversed.

*C. The Rejections under 35 U.S.C. § 103*

Claims 1-7 stand rejected under section 103 over Tsuchiyama taken with Keefer (Answer, page 3). The examiner finds that Tsuchiyama teaches catalytic CO conversion using water coolant but fails to teach a catalyst/sorbent mix nor pressure swing adsorption (PSA) separation (*id.*). Therefore the examiner applies Keefer to show the water gas shift reaction using a sorbent/catalyst mix wherein the products are separated by PSA using a purge gas with recycling (Answer, sentence bridging pages 3-4). From these findings, the examiner concludes that it would have been obvious to use the PSA system of Keefer with hydrogen as a sweep gas in the process of Tsuchiyama because "doing so recovers the non-

reacted gases and makes the process more economically efficient." Answer, page 4.

Although the examiner has cited portions of Keefer that separately disclose a countercurrent purge with the more adsorbable product and a countercurrent purge with the less adsorbable product (*id.,* citing col. 7, ll. 35-40, and col. 16, ll. 35-45), the examiner has not presented any convincing evidence or reasoning why one of ordinary skill in the art would have used these purges together and in the order recited in claim 1 on appeal. Similarly, although depressurization and pressurization are both disclosed by Keefer, the examiner has not established why these steps would be separate and in the order as recited in claim 1 on appeal.

Additionally, the examiner has not presented any convincing reason or evidence as to why one of ordinary skill in the art would have combined the teachings of the applied references. *See Micro Chemical Inc. v. Great Plains Chemical Co.,* 103 F.3d 1538, 1546, 41 USPQ2d 1238, 1244-45 (Fed. Cir. 1997)(The motivation to combine references may come from the references themselves, the knowledge of those skilled in the

art, or the nature of the problem to be solved). The examiner has not convincingly identified why one of ordinary skill in the art would have been motivated to use the PSA separation of Keefer in the process of Tsuchiyama. There is no evidence or convincing reasons why the recovery of non-reacted gases would have been desired or why this separation would have been "more economically efficient."

For the foregoing reasons and those set forth in the Brief, we determine that the examiner has not presented a *prima facie* case of obviousness in view of the reference evidence. Accordingly, the rejection of claims 1-7 under section 103 over Tsuchiyama taken with Keefer is reversed.

The rejection of claims 8-27 under section 103 employs the same references as discussed above further in view of Dandekar, JP '436, and Dexheimer (Answer, page 4). The secondary references to Dandekar, JP '436 and Dexheimer have been applied to show various features of dependent claims and thus do not remedy the deficiencies noted above in Tsuchiyama and Keefer (Answer, pages 4-5). Furthermore, the Official Notice taken by the examiner with respect to the disclosure of JP '436 (that Ag salts are functional equivalents to copper

salts as CO sorbents; see the Answer, page 5) was challenged by appellants (Brief, page 19). The examiner, in the Answer, has not supported the Official Notice with the appropriate evidence. *See In re Ahlert,* 424 F.2d 1088, 1091-92, 165 USPQ 418, 420-21 (CCPA 1970).

For the foregoing reasons and those set forth in the Brief, we determine that the examiner has not presented a *prima facie* case of obviousness in view of the reference evidence. Accordingly, the examiner's rejection of claims 8-27 under section 103 over Tsuchiyama taken with Keefer further in view of Dandekar, JP '436, and Dexheimer is reversed.

*D. The Rejection for Obviousness-type Double Patenting*

The examiner finds that the claims on appeal differ only from the claims present in co-pending application no. 08/419,317 (the parent application of this application) by the recitation of a cooling fluid in the claims here on appeal (Answer, page 5). The examiner finds that Dexheimer teaches the use of biphenyl oxide as a coolant medium (*id.*). From these findings, the examiner concludes, under the judicially created doctrine of obviousness-type double patenting, that the claims on appeal[5] are not patentably distinct from those pending in application no. 08/419,317 since use of a cooling fluid would have been obvious to control the reaction temperature (*id.*).[6]

---

[5] Although appellants state that the claims should be grouped into two groupings (Brief, page 8), no specific, substantive reasons have been presented for the separate patentability of any individual claim in this ground of rejection (Brief, page 20). Accordingly, pursuant to the provisions of 37 CFR § 1.192(c)(7)(1995), we select claim 1 from this grouping and decide this ground of rejection on the basis of this claim alone.

[6] The examiner notes that this is a provisional rejection since the conflicting claims have not in fact been patented. See the Answer, page 6; *In re Wetterau,* 356 F.2d 556, 557-58, 148 USPQ 499, 501 (CCPA 1966); and *Ex parte Karol,* 8 USPQ2d 1771, 1773-74 (Bd. Pat. App. & Int. 1988).

Appellants do not contest the examiner's analysis of the scope of the claims in application no. 08/419,317 but argue that Dexheimer "fails to motivate one of ordinary skill in the art to utilize the cooling and heating steps of the claimed invention" (Brief, page 20). Appellants also request the examiner to hold the rejection in abeyance until such time as the copending application is placed in allowance (*id.*).

Appellants' arguments are not persuasive. Heating and cooling in a moving reaction mass transfer zone by indirect heat exchange was well known to those of ordinary skill in the art, as evidenced by the examiner's previous citation of Tsuchiyama.[7] Specific high temperature heat exchange fluids with high thermal stability were also known in the art as shown by the examiner's reliance on Dexheimer (col. 1, ll. 10-15; ll. 28-32; col. 3, ll. 20-30). Accordingly, we agree with the examiner's position that it would have been well within the ordinary skill in the art at the time of appellants' invention to control the temperature of the moving reaction

[7] Tsuchiyama's use of a water coolant meets the limitation recited in claim 1 on appeal that the heat exchange fluid be "capable of phase change at temperatures maintained in each reactor" (see the specification, page 28, ll. 12-13).

mass transfer zone by conventional indirect heat exchange using the high temperature heat exchange fluids taught by Dexheimer for the benefit of their increased thermal stability. Therefore we affirm the examiner's rejection of claims 1-27 under the judicially created doctrine of obviousness-type double patenting over claims 1-22 of application no. 08/419,317 in view of Dexheimer.

*E. Summary*

The examiner's rejections of claims 1-27 under the first and second paragraphs of section 112 are reversed. The examiner's rejection of claims 1-7 under 35 U.S.C. § 103 over Tsuchiyama taken with Keefer is reversed. The examiner's rejection of claims 8-27 under 35 U.S.C. § 103 over Tsuchiyama taken with Keefer further in view of Dandekar, JP '436, and Dexheimer is reversed. The examiner's rejection of claims 1-27 under the judicially created doctrine of obviousness-type double patenting over claims 1-22 of application no. 08/419,317 in view of Dexheimer is affirmed. Accordingly, the decision of the examiner is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

**AFFIRMED**

| | |
|---|---|
| THOMAS A. WALTZ<br>Administrative Patent Judge | ) |
| PAUL LIEBERMAN<br>Administrative Patent Judge | ) BOARD OF PATENT APPEALS AND INTERFERENCES |
| BEVERLY A. PAWLIKOWSKI<br>Administrative Patent Judge | ) |

jg

PATENT ASSISTANT
AIR PRODUCTS AND CHEMICALS, INC.
PATENT DEPARTMENT
7201 HAMILTON BOULEVARD
ALLENTOWN, PA 18195-1501

**APPENDIX**

1. A process for operating an equilibrium controlled reaction in a system which comprises a plurality of reactors operated isothermally in a predetermined timed sequence wherein the heating and cooling requirements in a moving reaction mass transfer zone within each reactor are provided by indirect heat exchange with a fluid capable of phase change at temperatures maintained in each reactor during the following cyclic steps:

(a) reacting a feedstock at a first pressure in a first reactor containing an admixture of an adsorbent and a catalyst suitable for conducting the equilibrium controlled reaction under reaction conditions sufficient to convert the feedstock into a more adsorbable product which is selectively adsorbed by the adsorbent and a less adsorbable product and withdrawing the less adsorbable product in substantially pure form under a relatively constant flow rate at the first pressure;

(b) countercurrently depressurizing the first reactor to a second pressure by withdrawing a mixture comprising unreacted feedstock, a portion of the less adsorbable product and a portion of the more adsorbable product;

(c) countercurrently purging the first reactor at

the second pressure with a weakly adsorbing purge fluid with respect to the adsorbent wherein the weakly adsorbing purge fluid is a fluid other than the less adsorbable product to desorb the more adsorbable product from the adsorbent and withdrawing a mixture comprising unreacted feedstock, a portion of the more adsorbable product and a portion of the less adsorbable product;

(d) countercurrently purging the first reactor at the second pressure with the less adsorbable product to desorb the weakly adsorbing purge fluid and withdrawing a mixture comprising the weakly adsorbing fluid, a portion of the more adsorbable product and a portion of the less adsorbable product; and

(e) countercurrently pressurizing the first reactor from the second pressure to the first pressure with the less adsorbable product prior to commencing another process cycle within the first reactor.